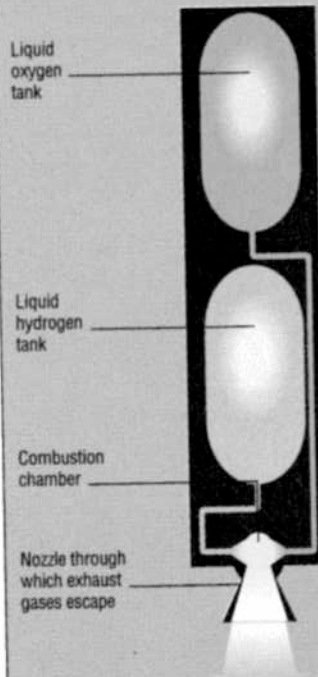
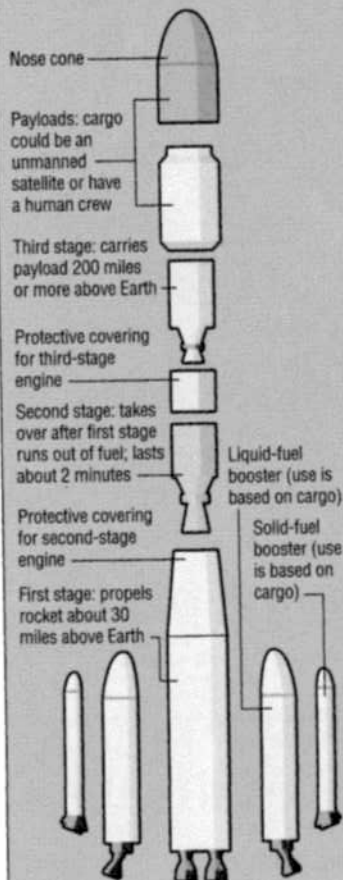


## How a Rocket Works



**ROCKET ENGINES ARE** the most powerful of all engines, enabling spacecraft to break free from Earth's gravity and speed along at more than 25,000 mph. While most engines need oxygen from the air to burn their fuel, rocket engines carry their own supply of oxygen, usually in the form of a liquid, enabling them to fly through space, where there is no air. When combined with fuel and ignited, the mixture burns as long as there is a supply of the oxygen (or oxidizer) and fuel. The burning releases gases out the rocket's tail. As the gases are released, the rocket is propelled forward with a tremendous thrust.

## A Typical Rocket



**ROCKETS ARE** usually made up of several parts, or stages. Each stage has its own engine and fuel, or propellant, with oxidizer. As the rocket flies through space, the stages are used, one by one. In this way, the vehicle becomes lighter, and it flies more easily.

# Getting into Space

Airplanes fly high in the sky, so why can't they just go higher and fly into space—to the moon or past a planet? Why did the rocket have to be invented to take us into space? The answer has to do with air and gravity.

Airplanes need air to propel them, and there is no air in space. Rockets carry their own supply of oxygen, so they can go into space.

Gravity is the force that pulls everything toward the Earth's center. Without gravity, everything—balls, humans, and airplanes—would fly off into the air. To travel into space, a vehicle has to escape the pull of gravity. In order to do this, a space vehicle has to go more than 25,000 miles per hour. This speed is known as the Earth's escape velocity. Airplanes can't go that fast. Only a rocket engine can thrust a vehicle into space fast enough to reach this escape velocity. Before rockets were invented, there was no way of getting out there, into space.



**THE 1951 FILM *THE DAY THE Earth Stood Still*** tells of a visitor from another planet who comes to Earth to warn the people that they will be destroyed if they don't stop fighting among themselves. To demonstrate his strength over our planet, he turns off all of the power in the world for 30 minutes.

